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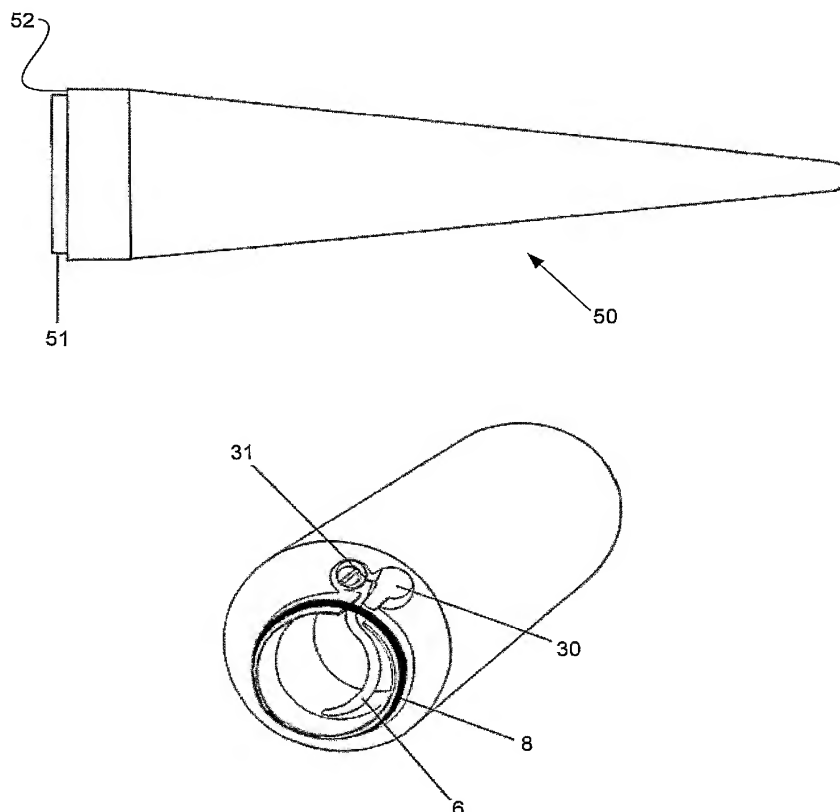
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[Continued on next page]

(54) Title: METHOD AND APPARATUS FOR EXTERMINATION OF PESTS



(57) Abstract: An extermination device for exterminating pests includes a holder, trigger mechanism (6) and a resilient ring (8) mounted on the holder. When a pest actuates the trigger mechanism (6), the ring (8) is released from the holder onto the pest, thereby killing the pest in a humane manner. A cover may be provided to protect the trigger mechanism (6) from dirt and animals larger than target pest size. A loading device (50) having a tapering body adapted to allow a resilient ring (8) to be expanded from the narrow end to the wide end of the tapering body, wherein the wide end includes a formation (51, 52) adapted to engage with a holder of an extermination device.

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METHOD AND APPARATUS FOR EXTERMINATION OF PESTS

FIELD OF THE INVENTION

5 The invention relates to a method and apparatus for the extermination of pests, in particular rats, stoats and other vermin.

BACKGROUND OF THE INVENTION

10 In a number of countries such as New Zealand, introduced species of animal have had a detrimental effect on the indigenous or native plant, bird, insect and other life.

In an attempt to control and exterminate pests, whether introduced species or not, a large number of different traps and similar mechanisms have been designed to capture and/or kill pests. A difficulty with many such traps is that the trapped pest does not die humanely and this can be a particular concern. A typical trap which is inhumane is the type of trap generally known as a gin trap which has a set of jaws to clamp a part of the pest. Normally in gin traps a pest is held until it either dies naturally or alternatively is killed by a person attending the trap.

20 An object of the present invention is to provide a lightweight versatile user friendly relatively inexpensive means for exterminating pests which at least offers a useful alternative choice.

25 A further object of the invention is to provide a means for exterminating a pest which substantially eliminates the risk of killing wildlife which is intended to be saved or preserved by use of the means for extermination, or to at least provide the public with a useful choice.

30 SUMMARY OF THE INVENTION

In a first aspect, the invention provides an extermination device, comprising a holder and a trigger mechanism, the holder being configured to hold an expanded resilient ring and the extermination device being configured to release the resilient ring, such that it contracts around a pest, when the trigger mechanism is actuated by the pest.

In a second aspect, the invention provides a method of exterminating a pest, comprising the steps of: expanding a resilient ring; and releasing the resilient ring onto a pest when the resilient ring is located around the pest.

BRIEF DESCRIPTION OF THE DRAWINGS

Examples of the invention will now be described with reference to the accompanying drawings in which:

Figure 1 is a perspective view from the side of an extermination device according to the invention;

Figure 2 is a side view of the extermination device shown in Figure 1;

Figure 3 is an end view of the extermination device;

Figure 4 is a perspective view from the side of the extermination device;

Figure 5 is a plan view of the exterminator device;

Figure 6 is a vertical section through an example of an extermination device incorporating a reloading and/or resetting mechanism with a plurality of resilient rings;

Figure 7 is a perspective view of an example of an extermination device having an internal trigger mechanism;

Figure 8 is a plan view of the device of Figure 7;

Figure 9 is a front plan view of a further embodiment of an extermination device;

Figure 10 is a perspective view of the device of Figure 9;

Figure 11 is a rear plan view of the device of Figure 9;

Figure 12 is a side plan view of the device of Figure 9, showing internal features;

Figure 13 shows the firing mechanism of the device of Figure 9;

Figure 14 shows the trigger mechanism of the device of Figure 9;

Figure 15 is a view similar to Figure 9, showing the device after it has been triggered and has released the resilient ring;

Figure 16 is a view similar to Figure 12, showing the device after it has been triggered and has released the resilient ring;

Figure 17 is a perspective view of a cover for use with the extermination device of Figure 9;

Figure 18 is a perspective view of the device of Figure 9 and the cover of Figure 17 in an assembled state; and

Figure 19 is a plan view of a loading device for use with the extermination device of Figure 9.

DESCRIPTION OF THE INVENTION

Examples of the invention will now be described with reference to the accompanying drawings. The first example in Figures 1 to 5 of the drawings show the actual size of an extermination device designed for rats or stoats. It is to be appreciated that for other animals the overall size and dimensions of the extermination device may be larger or smaller as needed to suit the size of the target pests.

In Figure 1 is shown an extermination device including a holder 100 and a front cover 3.

The holder 100 is shown in more detail in Figures 2 to 4. The holder 100 comprises a

central section 1 and a cover 2, and is tubular, with an internal bore 4. The holder may be circular in cross-section as shown in the drawings, or may have another suitable cross-section. The diameter of the bore 4 is chosen to suit the target pest and the tube has an entrance or open mouth 5 at a first end where the pest enters. For small pests such as mice, rats and stoats the diameter is preferably in the range 25 to 40 mm. For larger pests such as polecats, possums and cats, the diameter is preferably in the range 60 to 100 mm.

The second end of the holder 100 is formed by the cover 2, creating a closed region in which food or an attractant is placed.

The extermination device has a trigger operated by a trigger mechanism 6 shown in Figure 3. To set the trigger mechanism, it is pushed backwards in a slot 25 and to the right (as shown in Figure 4), such that it sits in a notch 24 in the holder. When a pest enters the trap, the trigger mechanism 6 moves accurately (as shown by arrow 7 in Figure 3), so that it is released from the notch and is forced forwards by a spring 20 to release the resilient ring 8. The resilient ring 8 is mounted relative to the mouth 5 of the extermination device in a release position, adjacent to the open mouth 5, such that after it slides off the open mouth 5 it contracts around whatever is within the open mouth 5 of the holder 100. Other trigger mechanisms may also be suitable.

The resilient ring 8 may be formed of natural or synthetic rubber or a composite material. It could also be formed from metal in the form of a spring, or at least partly of rigid material with a biasing means tending to force sides of the ring together. While the resilient ring is preferably circular in shape, it could, for example, be formed from a rectangle of resilient material with a hole cut through it. Other configurations may also be suitable.

The resilient ring 8 has a normal diameter that is significantly less than the diameter of the holder at the release position so that on release from the open mouth 5 it contracts to its normal size which is less than the size of the neck of the target pest.

On activation of the trigger mechanism 6 by a pest whose head is within the mouth 5 the rubber or composite ring 8 traps whatever is in the mouth of the extermination device. Any animal or pest that activates the trip arm 6 therefore has immediately

placed around its neck a resilient ring which will cut off the blood and air supply to the animal thereby killing it humanely.

Since the ring 8 is not retained by the extermination means, the animal may still move away from the site of the extermination means, so that other pests will be able to actuate the trigger mechanism.

As shown in Figure 1, a front cover 3 can be provided and is designed to protect against accidental tripping of the trip arm. The front cover 3 has an opening 9 to allow a pest to access the opening 5.

The front cover 3 connects with the holder at surface 10 and is positioned so that the target animal can still reach and actuate the trigger mechanism.

In the second example shown in Figure 6 the extermination device has similar parts to those incorporated in the first example referenced by the same numerals. In this case the exterminator device has an automatic loading mechanism. The loading mechanism includes a moveable shaft 11 with a ratchet mechanism 12 operated by the trigger mechanism 6. Movement of the shaft 11 is under the bias of a spring 13. The shaft 11 includes stops 14. A hinged cover 15 is provided to enable access to the mechanism when it is being reloaded with more or additional rings 8.

In use when an animal pest tries to eat bait or attractant 16 it knocks the trigger mechanism 6. A first ring is released from the release position, contracting around the pest's neck. The spring 13 will then push forward and the trigger mechanism will be reset on its next notch ready to be tripped again. The forward movement of the shaft 11 presents the next in the succession of rings 8 to the release position adjacent to the mouth 5 of the holder 100.

Figures 7 and 8 show a third example of an extermination device according to the invention. This example differs from the device described above in that the trigger mechanism is located within the holder. This protects the trigger mechanism from dirt, twigs and the like, which may prevent it from functioning correctly. The trigger functions in a manner similar to that described above.

These figures also show the device with a base plate 21 for mounting the extermination device in a suitable position. The base plate 21 preferably includes holes 22, 23 to facilitate such mounting.

5 A preferred embodiment of the invention is shown in Figures 9 to 19. Figure 9 is a front plan view, and Figure 10 is a perspective view, of the extermination device 1, showing the trigger mechanism 6, firing hammer 30 and resilient ring 8. With reference to Figure 13, the firing hammer 30 includes a generally cylindrical section 32 and a protrusion 33. The cylindrical section 32 slides on rod 35, which is joined to the rear face of the device housing by a screw 36, as shown in Figure 11. A spring 34 is mounted on the rod 35, to urge the firing hammer 30 along the rod 35 towards the resilient ring 8.

10 With reference to Figure 14, the trigger mechanism 6 is formed integrally with a lug 31 and is attached to the device housing by a screw 37.

15 In the cocked position shown in Figure 12, the firing hammer compresses the spring 34 and is held in position by the lug 31, as best shown in Figure 9. When a pest enters the trap, forcing the trigger mechanism 6 upwards, the trigger mechanism pivots around the screw 37, such that the lug 31 no longer restricts movement of the firing hammer 30. The firing hammer slides along the rod 35 towards the resilient ring 8. The protrusion 33 forces the resilient ring 8 off the holder, onto the pest. The position of the extermination device in the fired position as shown in Figures 15 and 16.

20 Figure 17 shows a cover 42 for use with the extermination device of this embodiment. The cover 42 includes a base section 40 and a cylindrical section 41. The base section 40 may include holes and/or slots for securing the extermination device to the ground, a tree etc. The device shown in figures 9 to 16 is assembled with the cover 42, as shown in Figure 18. Figure 18 shows the device and cover in a partially assembled state. The device is pushed into the cover through the cylindrical section 41. In a fully assembled state the device would rest against the end 43 of the cover. This arrangement protects the mechanism of the device from contamination by dirt etc and prevents animals of a size greater than the diameter of the cylindrical section 41 from activating the trap.

Figure 19 shows a loading device for use with the extermination device of Figures 9 to 16. The loading device includes a generally conical section 50 and a coupling section 51. In use, the device is set in the cocked position and the coupling section 51 is inserted into the device, such that the shoulder 52 sits flush with the open mouth 5 of the device. A resilient ring 8 can then be forced along the generally conical section 50 and into the release position on the extermination device. The loading device is then removed.

The device may be placed in any position that a targeted pest can access. The device may be placed on the ground, in a tree or attached to a board or post, for example.

While the present invention has been illustrated by the description of the embodiments thereof, and while the embodiments have been described in detail, it is not the intention of the Applicant to restrict or in any way limit the scope of the appended claims to such detail. Additional advantages and modifications will readily appear to those skilled in the art. Therefore, the invention in its broader aspects is not limited to the specific details, representative apparatus and method, and illustrative examples shown and described. Accordingly, departures may be made from such details without departure from the spirit or scope of the Applicant's general inventive concept.

CLAIMS

1. An extermination device, comprising a holder and a trigger mechanism, the holder being configured to hold an expanded resilient ring and the extermination device being configured to release the resilient ring, such that it contracts around a pest, when the trigger mechanism is actuated by the pest.

2. An extermination device as claimed in claim 1, wherein the holder is tubular and is open at a first end and closed at a second end.

3. An extermination device as claimed in claim 2, wherein at least part of the trigger mechanism is located within the holder.

4. An extermination device as claimed in claim 3, wherein the trigger mechanism is located entirely within the holder.

5. An extermination device as claimed in claim 3 or 4, wherein a bait or attractant is placed such that the trigger mechanism is between the first end and the bait or attractant.

6. An extermination device as claimed in any one of claims 2 to 5, wherein the trigger mechanism includes a lever.

7. An extermination device as claimed in any preceding claim, including a firing member, wherein the holder is configured to hold the resilient ring in a release position and the firing member is biased towards the release position, and wherein the firing member and trigger mechanism are arranged such that the firing member is released from a cocked position and forces the resilient ring off the holder, when the trigger mechanism is actuated.

8. An extermination device as claimed in claim 7, wherein the firing member and trigger mechanism are formed integrally.

9. An extermination device as claimed in any preceding claim, wherein the resilient ring is made from natural or synthetic rubber.

10. An extermination device as claimed in any one of claims 1 to 8, wherein the resilient ring is made from a composite material.

5 11. An extermination device as claimed in any one of claims 1 to 8, wherein the resilient ring is made from a spring.

12. An extermination device as claimed in any preceding claim, wherein a dimension of an opening of the holder is in the range 25 to 40 mm.

10 13. An extermination device as claimed in any one of claims 1 to 11, wherein a dimension of an opening of the holder is in the range 60 to 100 mm.

15 14. An extermination device as claimed in any preceding claim, wherein the holder is configured to hold a plurality of expanded resilient rings, and the extermination device is configured to release one of the plurality of expanded resilient rings when the trigger mechanism is actuated.

20 15. An extermination device as claimed in claim 14, wherein the holder is configured to hold a first one of the expanded resilient rings at a release position, and the extermination device is configured to move a second one of the expanded resilient rings to the release position when the first one of the expanded resilient rings is released from the release position.

25 16. An extermination device as claimed in claim 15, further comprising a biasing means configured to apply a force to the second one of the resilient rings, towards the release position.

30 17. An extermination device as claimed in claim 16, wherein the biasing means is coupled to the trigger mechanism.

18. An extermination device as claimed in any preceding claim, configured to release the resilient ring, such that it contracts around the neck of the pest.

35 19. A method of exterminating a pest, comprising the steps of:

expanding a resilient ring; and
releasing the resilient ring onto a pest when the resilient ring is located around the pest.

5 20. A method as claimed in claim 19, further comprising the step of holding the expanded resilient ring on a holder before releasing the resilient ring and wherein the step of releasing the resilient ring is performed when the pest actuates a trigger mechanism.

10 21. A method as claimed in claim 20, wherein the holder is tubular and is open at a first end and closed at a second end.

22. A method as claimed in claim 21, wherein at least part of the trigger mechanism is located within the holder.

15 23. A method as claimed in claim 22, further comprising the step of placing a bait or attractant in the holder such that the trigger mechanism is between the first end and the bait or attractant.

20 24. A method as claimed in any one of claims 20 to 23, comprising the step of loading the expanded resilient ring onto the holder, prior to holding the resilient ring on the holder.

25 25. A method as claimed in any one of claims 20 to 24, wherein the step of holding the expanded resilient ring comprises holding a plurality of expanded resilient rings, and the step of releasing the resilient ring comprises releasing one of the plurality of expanded resilient rings.

30 26. A method as claimed in claim 25, wherein the step of holding the expanded resilient ring comprises holding a first one of the plurality of the expanded resilient rings at a release position, the method further comprising the step of moving a second one of the expanded resilient rings to the release position when the first one of the expanded resilient rings is released.

27. A method as claimed in any one of claims 19 to 26, using the extermination device of any one of claims 1 to 17.

28. A loading device having a tapering body adapted to allow a resilient ring to be expanded from the narrow end to the wide end of the tapering body, wherein the wide end includes a formation adapted to engage with a holder of an extermination device.

29. A loading device as claimed in claim 28 in combination with an extermination device of any one of claims 1 to 18.

30. A method of loading an extermination device using a loading device as claimed in claim 28 comprising engaging the loading device with the holder and advancing a resilient ring from the narrow end to the wide end and onto the holder.

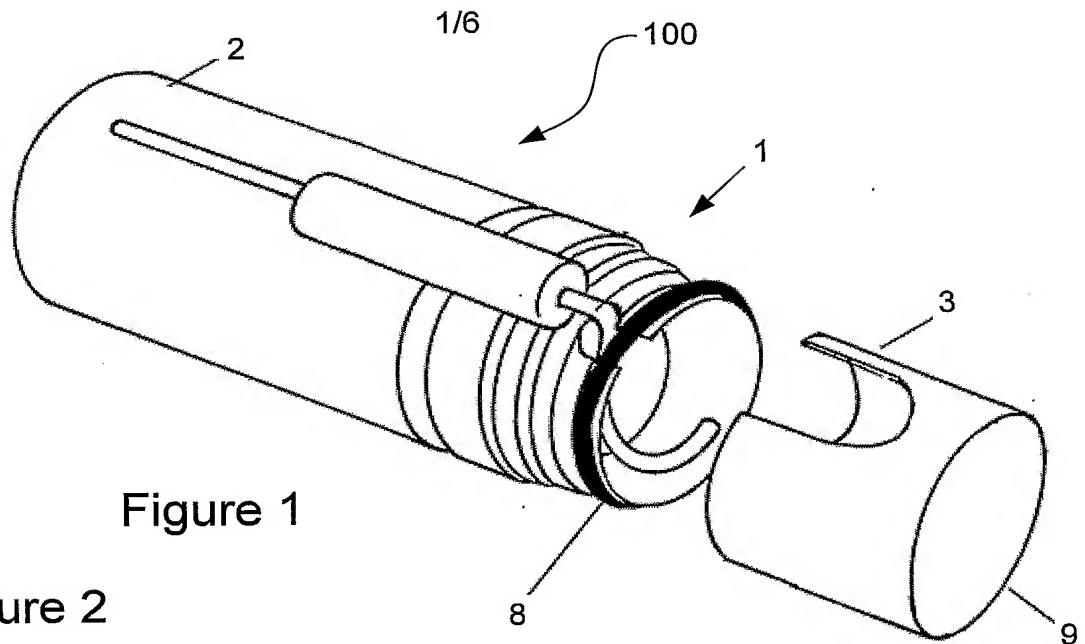


Figure 1

Figure 2

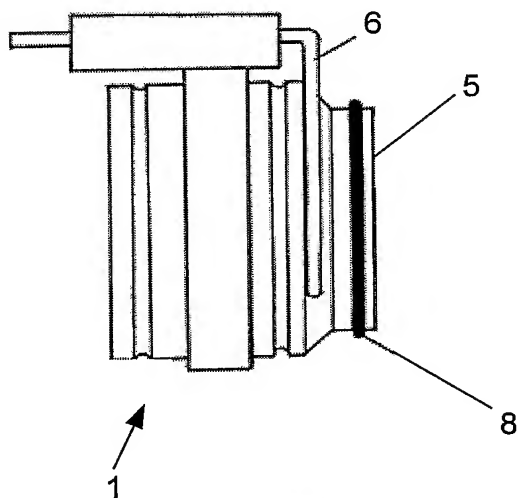


Figure 3

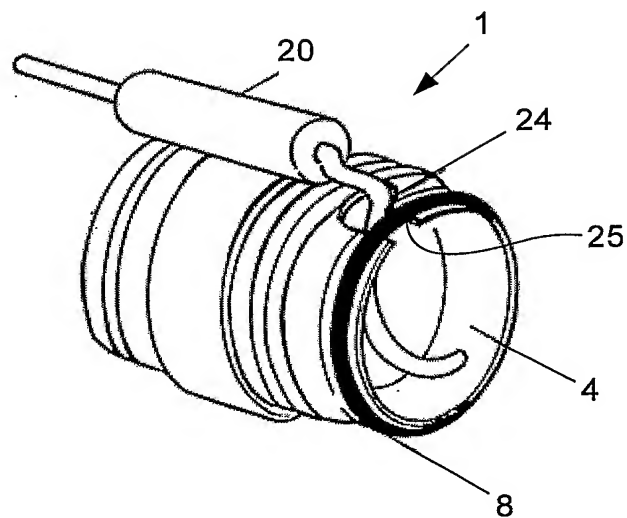
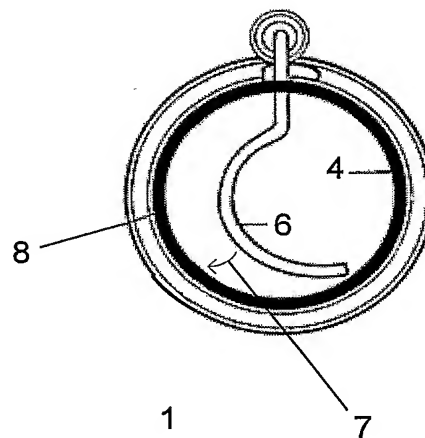
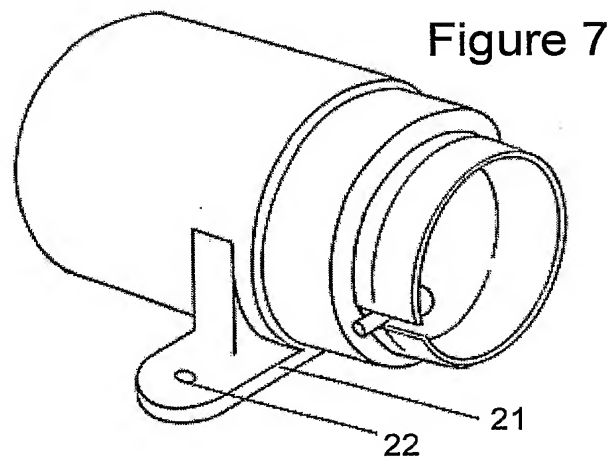
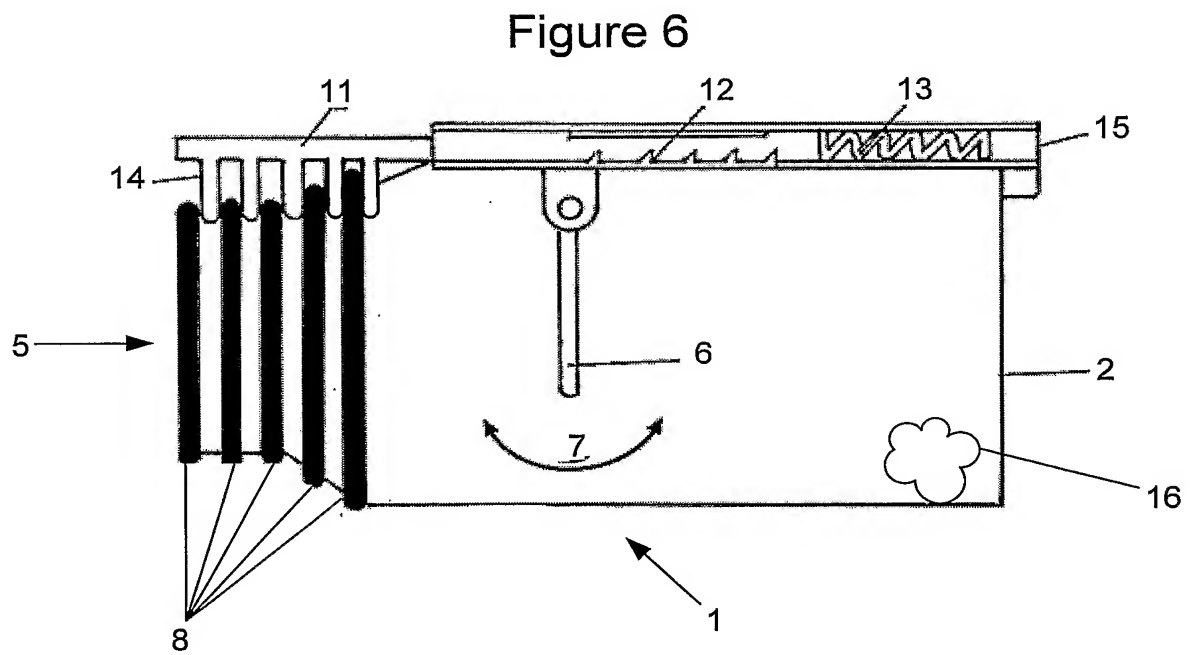
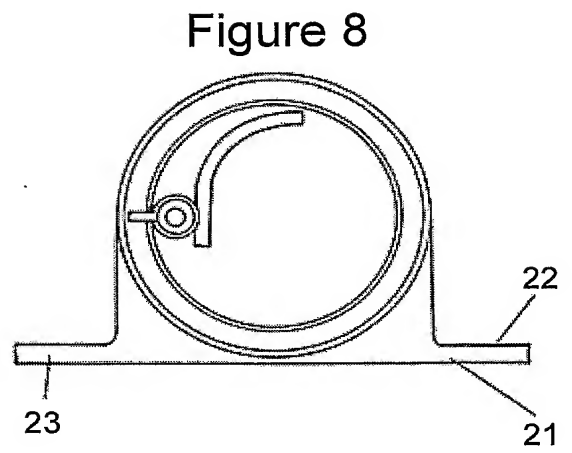
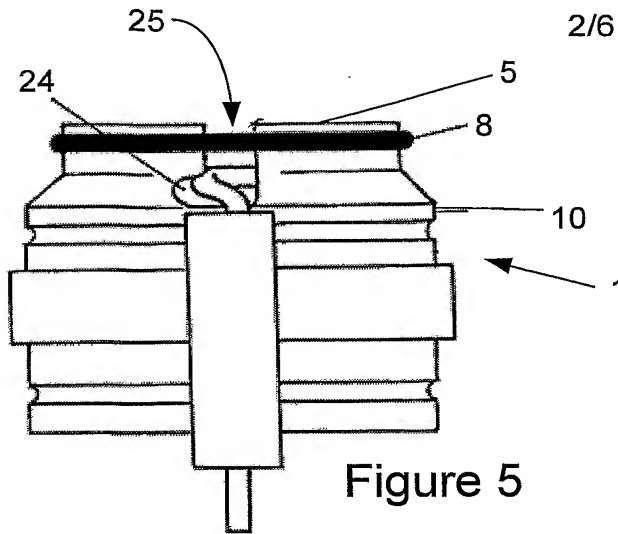


Figure 4



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Figure 9

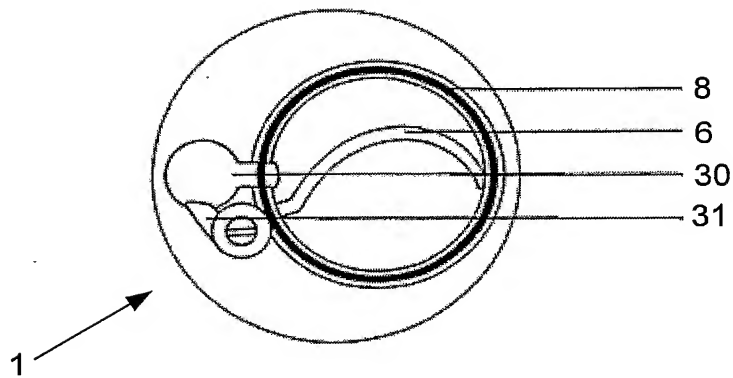


Figure 10

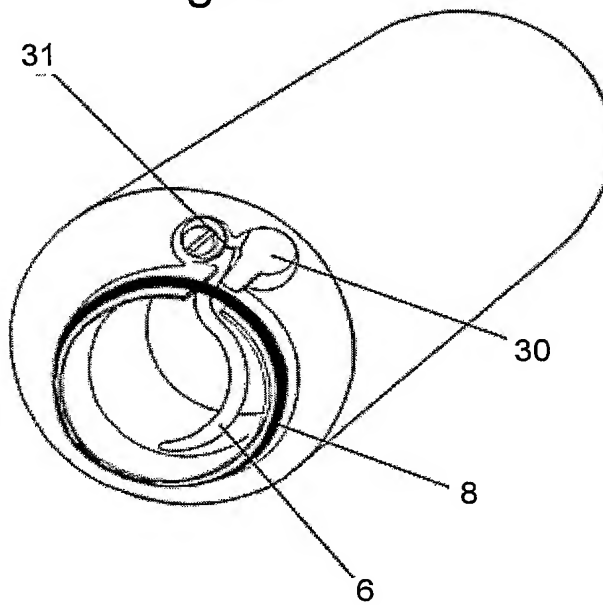
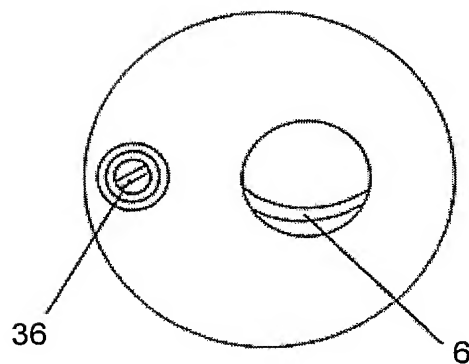


Figure 11



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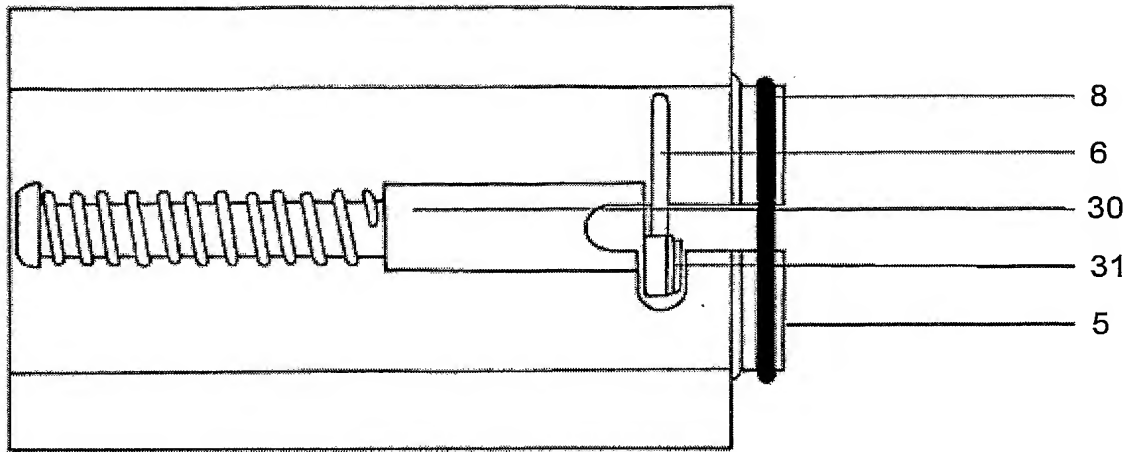


Figure 12

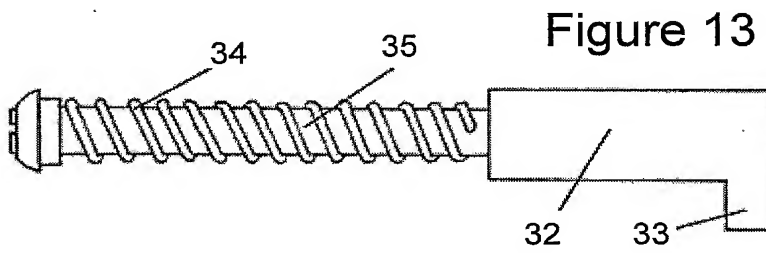


Figure 13

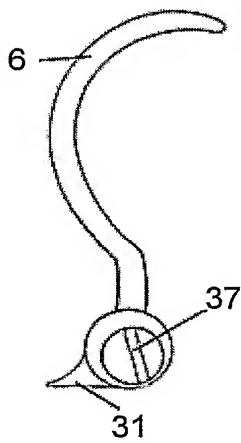


Figure 14

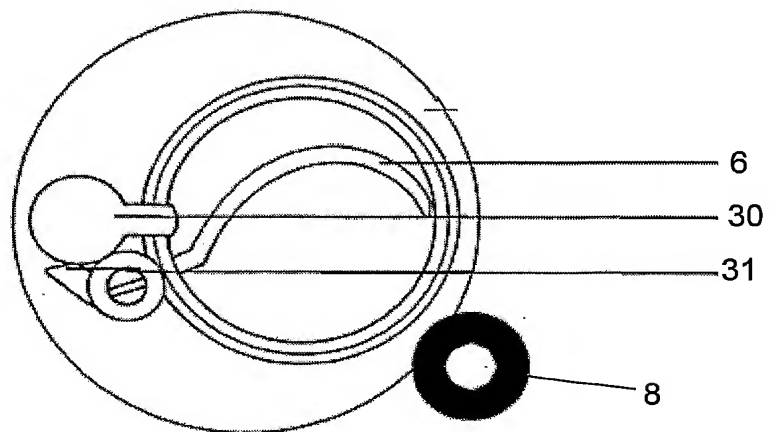


Figure 15

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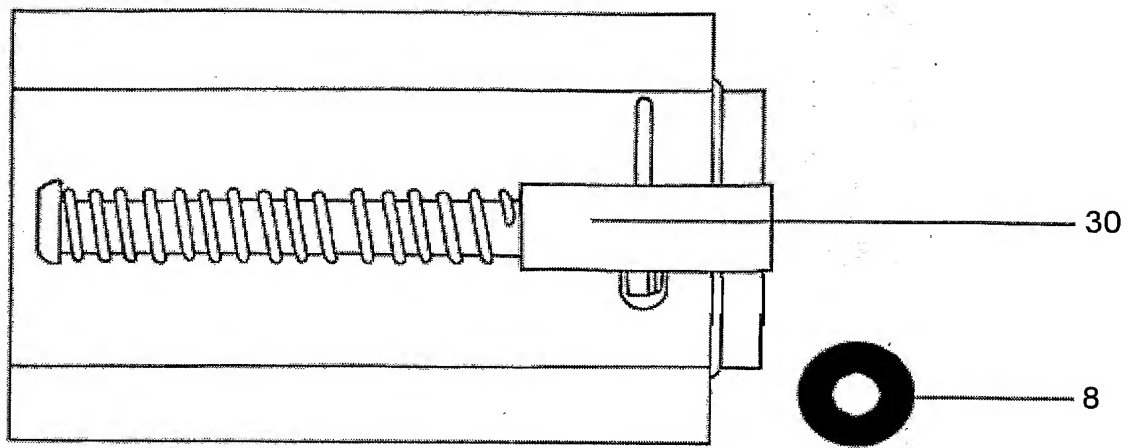


Figure 16

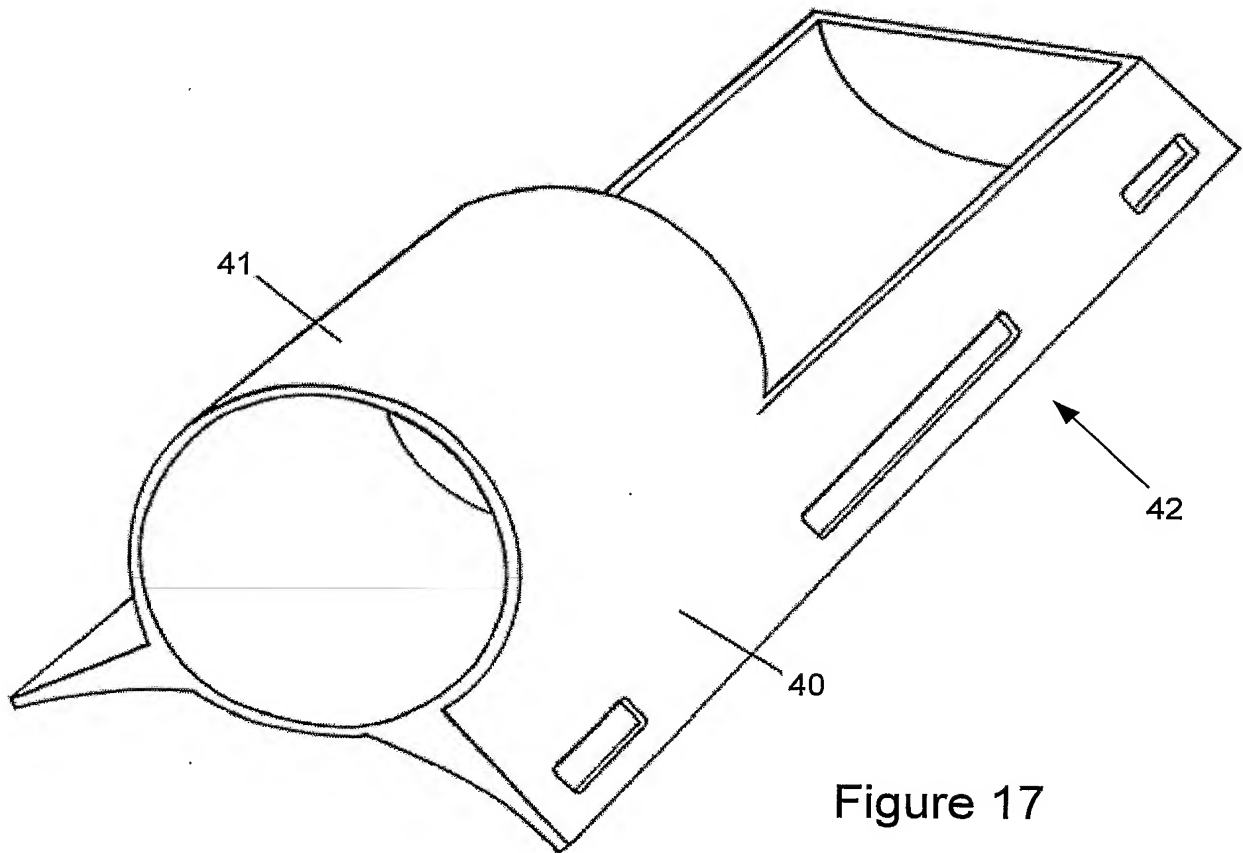


Figure 17

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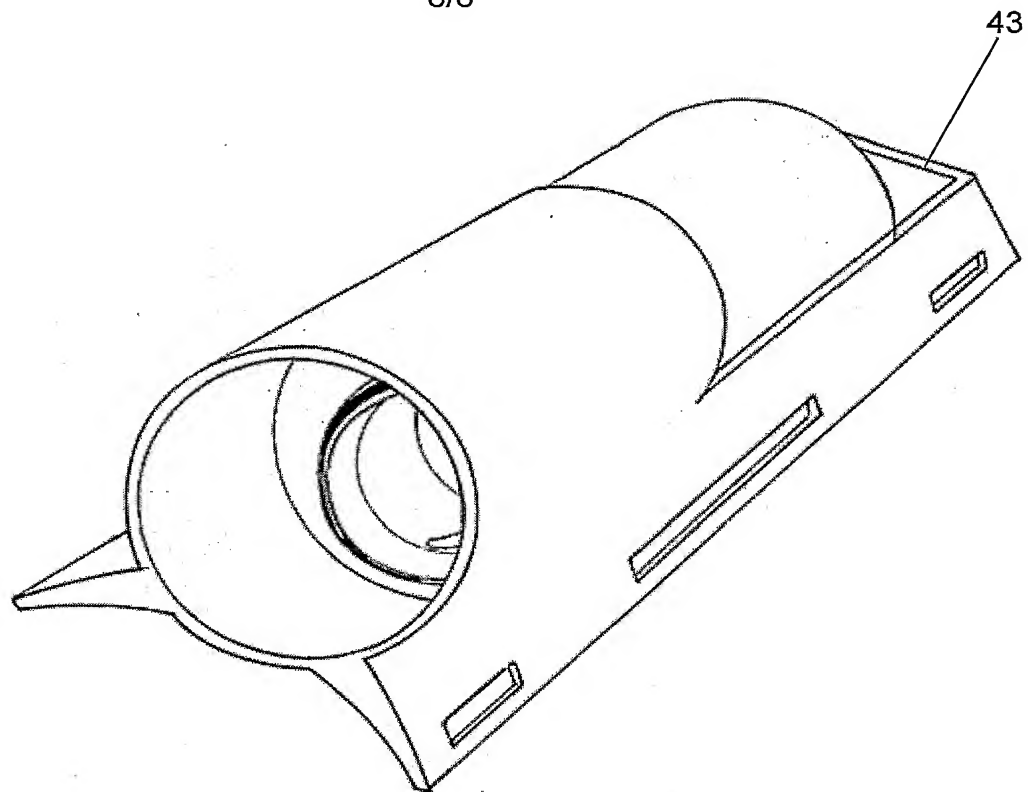


Figure 18

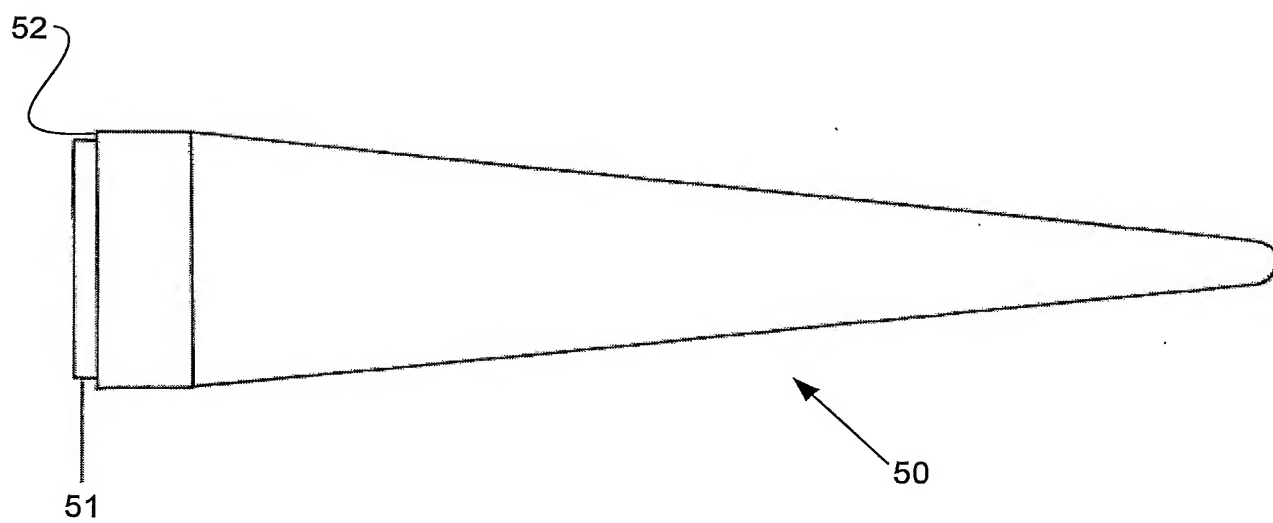


Figure 19

INTERNATIONAL SEARCH REPORT

International application No.

PCT/NZ2004/000316

A. CLASSIFICATION OF SUBJECT MATTER

Int. Cl. ⁷: A01M 23/00

According to International Patent Classification (IPC) or to both national classification and IPC

B. FIELDS SEARCHED

Minimum documentation searched (classification system followed by classification symbols)

Documentation searched other than minimum documentation to the extent that such documents are included in the fields searched

Electronic data base consulted during the international search (name of data base and, where practicable, search terms used)

DWPI, US, EP and JP databases with keywords (eg A01M 23/ic, resilient, ring)

C. DOCUMENTS CONSIDERED TO BE RELEVANT

Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
X	Patent Abstracts of Japan, JP 2001-333683 (MORIBE IKUO) 4 December 2001 Abstract	1-27
X	US 5177896 A (MIYASAKI) 12 January 1993 Entire document	1-27
X	US 2247066 A (POPP) 24 June 1941 Entire document	1-27
X	Patent Abstracts of Japan, JP 2003-070408 (MURAKAMI HIDEAKI) 11 March 2003 Abstract	1-27

☐ Further documents are listed in the continuation of Box C

☒ See patent family annex

* Special categories of cited documents:	"T" later document published after the international filing date or priority date and not in conflict with the application but cited to understand the principle or theory underlying the invention
"A" document defining the general state of the art which is not considered to be of particular relevance	"X" document of particular relevance; the claimed invention cannot be considered novel or cannot be considered to involve an inventive step when the document is taken alone
"E" earlier application or patent but published on or after the international filing date	"Y" document of particular relevance; the claimed invention cannot be considered to involve an inventive step when the document is combined with one or more other such documents, such combination being obvious to a person skilled in the art
"L" document which may throw doubts on priority claim(s) or which is cited to establish the publication date of another citation or other special reason (as specified)	"&" document member of the same patent family
"O" document referring to an oral disclosure, use, exhibition or other means	
"P" document published prior to the international filing date but later than the priority date claimed	

Date of the actual completion of the international search
11 April 2005

Date of mailing of the international search report
14 APR 2005

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INTERNATIONAL SEARCH REPORT

International application No.

PCT/NZ2004/000316

Box No. II Observations where certain claims were found unsearchable (Continuation of item 2 of first sheet)

This international search report has not been established in respect of certain claims under Article 17(2)(a) for the following reasons:

1. ☐ Claims Nos.:
because they relate to subject matter not required to be searched by this Authority, namely:
2. ☐ Claims Nos.:
because they relate to parts of the international application that do not comply with the prescribed requirements to such an extent that no meaningful international search can be carried out, specifically:
3. ☐ Claims Nos.:
because they are dependent claims and are not drafted in accordance with the second and third sentences of Rule 6.4(a)

Box No. III Observations where unity of invention is lacking (Continuation of item 3 of first sheet)

This International Searching Authority found multiple inventions in this international application, as follows:

Please refer to the Supplemental Box

1. ☐ As all required additional search fees were timely paid by the applicant, this international search report covers all searchable claims.
2. ☐ As all searchable claims could be searched without effort justifying an additional fee, this Authority did not invite payment of any additional fee.
3. ☐ As only some of the required additional search fees were timely paid by the applicant, this international search report covers only those claims for which fees were paid, specifically claims Nos.:
4. ☒ No required additional search fees were timely paid by the applicant. Consequently, this international search report is restricted to the invention first mentioned in the claims; it is covered by claims Nos.: 1-27

Remark on Protest

- ☐ The additional search fees were accompanied by the applicant's protest.
- ☐ No protest accompanied the payment of additional search fees.

INTERNATIONAL SEARCH REPORT

International application No.

PCT/NZ2004/000316

Supplemental Box

(To be used when the space in any of Boxes I to VIII is not sufficient)

Continuation of Box No: III

The international application does not comply with the requirements of unity of invention because it does not relate to one invention or to a group of inventions so linked as to form a single general inventive concept. In coming to this conclusion the International Searching Authority has found that there are different inventions as follows:

1. Claims 1-27 are directed to an extermination device and a method of using the device, wherein the device comprises of a holder and trigger mechanism, the holder being configured to hold an expanded resilient ring.
2. Claims 28-30 are directed to a loading device and a method of using the device, wherein the device has a tapering body and a formation at the wide end adapted to engage with the holder of an extermination device.

Since the abovementioned groups of claims do not share any of the technical features identified, a 'technical relationship' between the inventions, as defined in PCT rule 13.2 does not exist. Accordingly the international application does not relate to one invention or to a single inventive concept, a priori.

INTERNATIONAL SEARCH REPORT

International application No.

PCT/NZ2004/000316

Information on patent family members

This Annex lists the known "A" publication level patent family members relating to the patent documents cited in the above-mentioned international search report. The Australian Patent Office is in no way liable for these particulars which are merely given for the purpose of information.

Patent Document Cited in Search Report			Patent Family Member	
JP	2001-333683	NIL		
US	5177896	CA	2086774	
US	2247066	NIL		
JP	2003-070408	NIL		
Due to data integration issues this family listing may not include 10 digit Australian applications filed since May 2001.				
END OF ANNEX				

PUB-NO: WO2005053392A1
DOCUMENT-IDENTIFIER: WO 2005053392 A1
TITLE: METHOD AND APPARATUS FOR
EXTERMINATION OF PESTS
PUBN-DATE: June 16, 2005

INVENTOR-INFORMATION:

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APPL-NO: NZ2004000316
APPL-DATE: December 6, 2004

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INT-CL (IPC): A01M023/00

EUR-CL (EPC): A01M023/34

ABSTRACT:

CHG DATE=20050628 STATUS=O>An extermination device for exterminating pests includes a holder, trigger mechanism (6) and a resilient ring (8) mounted on the holder. When a pest actuates the trigger mechanism (6), the ring (8) is released from the holder onto the pest, thereby killing the pest in a humane manner. A cover may be provided to protect the trigger mechanism (6) from dirt and animals larger than target pest size. A loading device (50) having a tapering body adapted to allow a resilient ring (8) to be expanded from the narrow end to the wide end of the tapering body, wherein the wide end includes a formation (51, 52) adapted to engage with a holder of an extermination device.